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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/662,835	09/15/2003	Iulian Gheorghe	02-33	1215

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EXAMINER
MORILLO, JANELL COMBS

ART UNIT	PAPER NUMBER
1742	

DATE MAILED: 10/18/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/662,835	GHEORGHE ET AL.	
	Examiner	Art Unit	
	Janelle Combs-Morillo	1742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *July 30, 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-64* is/are pending in the application.

4a) Of the above claim(s) *39-64* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-38* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-3, 5-19, 30, and 32-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chakrabarti et al (US 2002/0121319 A1) in view of "Aluminum and Aluminum Alloys" pp. 267, 529.

Chakrabarti et al teaches a process for manufacturing Al-Zn-Cu-Mg alloy products of high strength (see Table 3) by direct chill casting an ingot (see [0033]), homogenizing in optionally two steps (see [0102], such as first heating above 850°F, and then heating to above about 890°F, for a total time of 4-20 hrs or more, which is a close approximation of the presently claimed homogenization treatment), extruding at 600-750°F with an extrusion ratio of 10:1 or more (see [0104]), solution heat treating at 840-900°F in order to take into solution substantially all soluble Zn, Mg, and Cu (see [0105]), quenching, and artificially aging in multiple stages to obtain high strength (see [0017-0019]). Chakrabarti et al teaches performing said process on alloys comprising: 6-10% Zn, 1.2-1.9% Mg, 1.2-2.2% Cu, one or more of: up to 0.4% Zr, up to 0.4% Sc, and up to 0.3% Hf (see [0023]) and optionally 0.01-0.06% Ti (see [0026]), which overlaps or touches the boundary of the instant compositional ranges of Zn, Cu, Zr, Sc, Hf, Ti (independent claims 1 and 30, dependent claims 2, 3, 5, 6, 7, 32, 33), and is a close approximation of the presently claimed range of Mg (1.9% Mg is a close approximation of

1.95%). It would have been obvious to one of ordinary skill in the art to select any portion of range, including the claimed range, from the broader range disclosed in Chakrabarti because Chakrabarti finds that the prior art composition in the entire disclosed range has a suitable utility.

Chakrabarti does not teach a) the casting speed of said DC casting, b) extruding in order to obtain a microstructure ≥ 80% unrecrystallized, or c) homogenizing in order to obtain a uniform distribution of η precipitate and Zr dispersoids.

Concerning item a), "Aluminum and Aluminum Alloys" teaches that aluminum ingots can be direct chill cast at casting rates of up to 0.65 ft/min (≤ 7.8 in/min), which substantially overlaps the ranges of 1-6 in/min in instant claim 1, as well at 1-4 in/min in instant claim 30. It would have been obvious to one of ordinary skill in the art to perform the process of casting, heat treating, and working as taught by Chakrabarti, wherein DC casting is performed at speeds ≤ 7.8 in/min, substantially as set forth by "Aluminum and Aluminum Alloys", because "Aluminum and Aluminum Alloys" teaches that said casting rate is conventional for direct chill casting ingots (see p 529).

Concerning items b) and c), the examiner asserts that where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a prima facie case of either anticipation or obviousness has been established. *In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977). "When the PTO shows a sound basis for believing that the products of the applicant and the prior art are the same, the applicant has the burden of showing that they are not." *In re Spada*, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990). Because the prior art teaches a process of homogenizing and extruding said overlapping alloy composition at substantially the

same temperatures, then substantially the same results, such as recrystallization and distribution of precipitates and dispersoids, are expected to be present.

Concerning claims 8 and 9, which mention the times for the first and second homogenization steps, the examiner asserts that though Chakrabarti does not teach the particular time schedules as presently claimed, the time at said homogenization temperature is held to be a result effective variable, wherein the recognized result is a more homogenous structure. Changes in temperature, concentrations, or other process conditions of an old process does not impart patentability unless the recited ranges are critical, i.e. they produce a new and unexpected result. However, said parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation. *In re Antonie*, 559 F.2d 618, 195 USPQ 6 (CCPA 1977) See also *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Concerning claim 11 and independent claim 30, which mentions the extrusion rate, though Chakrabarti does not teach the particular extrusion rate as presently claimed, "Aluminum and Aluminum Alloys" teaches that extrusion rates of 3-6ft/min are typical for 7000 series aluminum alloys (p 267, Fig. 10). It would have been obvious to one of ordinary skill in the art to perform the process of casting, heat treating, and extruding as taught by Chakrabarti, wherein extruding is performed at speeds 3-6ft/min, substantially as set forth by "Aluminum and Aluminum Alloys", because "Aluminum and Aluminum Alloys" teaches that said extrusion speed is conventional for 7000 series alloys (see p 267, Fig. 10).

Concerning claims 10, 13-17, and 35-38, as stated above, Chakrabarti et al teaches substantially the same processing steps, including quenching (claim 10), and artificially aging in

multiple stages (see [0017-0019]). More particularly, Chakrabarti et al teaches aging in 2 or 3 steps- aging at a first temperature of 230-250°F for 2-18 hrs (see [0017]), aging at a second temperature of 305-325°F for 6-18 hr (see [0018]), and optionally aging at a third temperature of 230-250°F for 2-18 hrs (see [0019]), which overlaps the presently claimed aging temperature ranges and times.

Concerning claims 12 and 34, Chakrabarti teaches solution heat treating at 840-900°F in order to take into solution substantially all soluble Zn, Mg, and Cu (see [0105]). The proper time at the solution heat treatment is held to be a result effective variable, wherein the expected result is a solid solution (see above discussion concerning result effective variables).

Concerning claims 18 and 19, though Chakrabarti does not teach the fracture toughness or tensile strength in relation to a similarly fabricated 7075 alloy, Chakrabarti does teach said alloy processed as stated above exhibits very good strength and toughness (see [0123], abstract). The examiner asserts that where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a prima facie case of either anticipation or obviousness has been established. *In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977). "When the PTO shows a sound basis for believing that the products of the applicant and the prior art are the same, the applicant has the burden of showing that they are not." *In re Spada*, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990). Because Chakrabarti teaches a substantially overlapping alloy processed substantially as presently claimed, then substantially the same results, such as fracture toughness and strength, are expected to result.

3. Claims 4, 20-29, 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chakrabarti et al (US 2002/0121319 A1) and "Aluminum and Aluminum Alloys" pp. 267 and 529, as applied to claims above, in view of Holroyd (US 5,932,037).

Chakrabarti does not teach the instant range of Cr (claims 4, 20, 31). However, Holroyd teaches that both Zr and Cr are known recrystallization inhibitors added to 7000 series alloys, wherein alloys with Cr require less critical control of homogenization and lower extrusion pressures (column 2 lines 32-43), and while alloys with Zr are less quench sensitive and potentially have higher fracture toughness (column 7 lines 56-67). It would have been obvious to one of ordinary skill in the art to replace Zr taught by Chakrabarti with Cr (or to have both as recrystallization inhibitors, see Holroyd at column 2 lines 31, 44), because Holroyd teaches that both elements are known recrystallization inhibitors added to 7000 series alloys, and/or because alloys with Cr require less critical control of homogenization and lower extrusion pressures (column 2 lines 32-43).

Concerning dependent claims 21 and 22, as stated above, Chakrabarti teaches an overlapping alloy composition.

Concerning dependent claim 23, see arguments above concerning solution heat treatment.

Concerning dependent claims 24-27 and 29, as stated above, Chakrabarti teaches an overlapping aging schedule.

Concerning dependent claim 28, see arguments above concerning fracture toughness.

Response to Amendment/Arguments

4. In the response filed on July 30, 2004, applicant amended claims 1, 3, 20, 30, and submitted various arguments traversing the rejections of record.

Applicant's argument that the present invention is allowable over the prior art of record because Chakrabarti teaches a lower level of Mg has not been found persuasive (arguments p 15). Chakrabarti teaches up to 1.9% Mg, which is a close approximation of the presently claimed 1.95% Mg. A prima facie case of obviousness exists where the claimed ranges and prior art ranges do not overlap but are close enough that one skilled in the art would have expected them to have the same properties. Titanium Metals Corp. of America v. Banner, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985). Because one of skill in the art would expect 1.9% Mg, as taught by Chakrabarti, to have the same properties as 1.95% Mg, it is held that Chakrabarti has created a prima facie case of obviousness of the presently claimed invention.

Applicant's argument that the present invention is allowable over the prior art of record because Chakrabarti teaches away from applicant's invention (arguments p 16) or because Chakrabarti teaches preferred ranges outside the presently claimed ranges (arguments p 17-18), has not been found persuasive. A reference disclosure must be evaluated for all that it fairly suggests and not only for what is indicated as preferred, In re Boe, 53 CCPA 1079, 335 F.2d 961, 148 USPQ 507 (1966). Additionally, though Chakrabarti teaches higher levels of Mg and Cu (such as comparative alloy AA 7055, which falls within the instant alloying ranges) result in degradation of strength or fracture toughness for slowly quenched alloys (see Fig. 3 of Chakrabarti- different combinations/compromises of strength and toughness take place for alloys of varying Zn, Mg, and Cu values), applicant has not shown that the instant process when

performed with the presently claimed Al-Zn-Cu-Mg alloy, does not likewise result in a similar compromise between strength and fracture toughness.

In response to applicant's arguments against the references individually (applicant argues on p. 18 that Chakrabarti does not teach a casting speed), one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). As stated above, "Aluminum and Aluminum Alloys" teaches the presently claimed casting speed.

Applicant's argument that the present invention is allowable over the prior art of record because Chakrabarti teaches a higher homogenization temperature has not been found persuasive. The second homogenization temperature of 890°F is a close approximation of the presently claimed 880°F (~1% difference). Alternatively, applicant's homogenizing step at a first temperature range followed by a second temperature range (wherein said temperature ranges overlap at 860°F) does not require heating to two different temperatures. A single homogenization step at 860°F would meet the presently claimed homogenizing limitation.

Applicant's argument that the present invention is allowable over the prior art of record because Chakrabarti does not mention the particular precipitates that are homogeneously distributed at this stage (arguments p 18), or the time at each stage (arguments page 21), has not been found persuasive. The purpose of homogenization heat treatments is to make an alloy microstructure (comprised of solid solution and precipitated phases) more homogeneous/uniformly distributed. This includes Zr and η precipitates. With regard to the time

at each stage, as stated above, Chakrabarti teaches a cumulative hold time 4-20 hrs [0102], and applicant has not shown the criticality of the presently claimed hold times.

Applicant's argument that the present invention is allowable over the prior art of record because the presently claimed casting rate is important to obtain a controlled microstructure for further processing (arguments p 19) has not been found persuasive. Applicant has not shown specific unexpected results with regard to the overlapping casting rate taught by the prior art of "Aluminum and Aluminum Alloys".

Applicant's argument that the present invention is allowable over the prior art of record because Chakrabarti does not mention the time at the solution heat treatment temperature has not been found persuasive. As stated above, the time at said temperature is held to be a result effective variable. Additionally, "Aluminum and Aluminum Alloys" teaches that time at a given solution heat treatment temperature is dependent on section thickness for a particular alloy (p 296, Table 4). The examiner maintains that the time at the solution heat treatment temperature taught by Chakrabarti is a result effective variable, wherein the expected result is said alloy in a substantial solid solution.

Conclusion

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after

the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Janelle Combs-Morillo whose telephone number is (571) 272-1240. The examiner can normally be reached on 8:30 am- 6:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

jcm

October 12, 2004

GEORGE WYSZOMIERSKI
PRIMARY EXAMINER